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COMPLETE SPECIFICATION.

**“An Improved Process for Making an Easily Digestible Milk Preparation Free from Germs.”**

We, SALAMON SZÉKELY and EMERICH KOVÁCS both of 43, Teréz Körut, Budapesth in the Kingdom of Hungary, Chemists, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

5 The use of raw milk as food is deprecated by physicians because disease germs may be contained in it and its use therefore involves a danger of infection. For this reason milk more particularly that intended for food for infants is usually sterilized by being heated to a high temperature.

10 Milk sterilized in this manner however loses its natural flavour and character more particularly because the soluble albumens of the milk coagulate, the enzymes and other organic constituents of the milk are destroyed, and also its salts undergo alterations. Owing to these changes in the character and composition of the milk many object to drink boiled milk and in the case of infants especially there are certain consequent illnesses (rachitis, (rickets) scurvy and  
15 the like) which are ascribed to the use of sterilized milk.

In cows' milk in contrast to womens' milk there is much casein and tricalcic phosphate contained, which form the constituents of the milk which are the most difficult of digestion.

20 If therefore the milk is to be given to infants as a substitute for mothers' milk, the constituents such as casein and phosphate of lime held in suspension in the milk must be diminished. In order to attain this water or whey are usually added to the milk and it is then sterilized whereby however as previously mentioned the milk is considerably altered. In order to free the milk from any disease germs contained in it and also to render its composition more  
25 suitable for infants whilst retaining as far as possible its integrity, the applicants proceed in the following manner.

By a suitable precipitation of the constituents such as casein and phosphate of lime held in suspension in the milk, a sterile or approximately sterile whey can be obtained without its having to be previously heated to a temperature at  
30 which the albumens coagulate or the other constituents of the milk undergo substantial alterations, but such a whey still contains all the soluble constituents of the raw milk in an unchanged form. Applicants have already attempted to obtain such a whey by precipitating the constituents held in suspension in the milk by means of carbonic acid at high pressure and this  
35 process has already been patented by them and is wellknown. In carrying out the process in practice however it has been found, that in order to obtain a sterile or approximately sterile whey by precipitation of the casein and phosphate of lime, certain conditions must be observed if a preparation which is reliable under all circumstances is to be obtained.

40 If in fact the suspended constituents of milk be precipitated by means of carbonic acid, by conducting carbonic acid under high pressure into milk contained in a pressure vessel and thoroughly mixing it with the milk, an absolutely sterile or approximately sterile whey will be obtained only in case the suspended constituents are instantaneously precipitated as a coherent spongy mass, they  
45 always filling up the whole pressure vessel at the moment of precipitation. By

[Price 8d.]



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this method of precipitation, whilst the casein is instantaneously converted so to speak from the swollen condition into a solid aggregate condition, the foreign substances, such as dirt, manure, particles of fodder and also mould germs and the bacteria of the milk are encased and retained by the coagulated mass.

If care be taken in discharging the whey from the pressure vessel, to retain 5 the precipitated spongy mass fully intact in the vessel and that none of it is carried off in the discharged whey, the whey obtained is entirely or approximately sterile. If however the whey be removed from the pressure vessel mixed with the precipitated casein or if even only a few casein flakes pass into the whey or are mixed therewith, the whey will absorb a quantity of 10 bacteria corresponding to the quantity of the casein particles mixed with it. This is more particularly the case if the mass owing to insufficient or unsuitable precipitation is precipitated wholly or partially in fine grains or in small slippery lumps in which case a sterile whey can hardly be obtained even with subsequent filtration. In order that 15 the casein and the other constituents and impurities hereinbefore mentioned of the milk may be precipitated in a spongy mass, skim milk is preferably employed and is preferably heated as highly as possible but not above a temperature of 67° C, because at a higher temperature the soluble milk constituents are already changed, which must absolutely be avoided. When precipitation 20 has taken place in the desired manner, it is a question of obtaining merely the whey alone through the valve of the pressure vessel, without casein flakes, so that the entire precipitated mass may remain behind in one mass in the apparatus. This method of discharging forms a part of the object of the present invention and may for instance be effected in the following manner. 25 The whey is discharged from the pressure vessel, without allowing the surplus carbonic acid to escape, through a valve which is only partly opened, care being taken that a small quantity of the whey first discharged which may perhaps contain some flakes of casein, is caught separately, the valve is then fully opened and the remainder of the whey discharged. When only a little whey 30 is left in the apparatus, the valve is again so adjusted that the whey can only escape in a very thin stream.

When the whey has been discharged, the valve is stopped by the first particles of casein flowing into it and by the mass of casein (spongy mass) becoming jammed therein. At this moment the valve is closed and the carbonic acid is 35 allowed to escape by a second valve which is situated at the upper part of the apparatus.

In this manner a sterile or approximately sterile whey is obtained. Now in order to produce milk or food for infants free from germs or approximately so, it is mixed with sterilized or pasteurized milk or cream; the milk obtained is 40 free from any disease germs which may have originally been contained but its original integrity is only altered in the proportion in which sterilized milk or cream has been added to the whey. If desired 1—2% of sterile sugar is also added.

In the preparation of milk for infants the casein contents of cows' milk (3%) 45 is reduced to that of womans' milk (1%). About 2 parts of whey is therefore mixed with 1 part of sterilized or pasteurized milk or cream and even if desired with 1—2% of sterile sugar and the like, whilst yet the integrity of the raw milk is maintained to  $\frac{2}{3}$  parts.

Having now particularly described and ascertained the nature of our said 50 invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a process for making an easily digestible milk preparation free from germs, mixing sterile or approximately sterilized whey which has been previously heated but not to the temperature at which the albumens coagulate, in 55

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suitable proportions with sterilized or pasteurized milk or sterilized or pasteurized cream.

2. In the production of a sterile or approximately sterile whey without heating it to the temperature at which albumen coagulates, by introducing carbonic acid under pressure for the purpose of precipitating milk constituents held in suspension, separating the whey from the substances which are precipitated as far as possible in a coherent mass in such a way that the precipitated mass remains completely in the pressure vessel and the clear whey runs off, the muddy liquid which first runs out being caught separately and not used with the other whey.

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W. P. THOMPSON & Co.,  
6 Lord St., Liverpool &  
322 High Holborn, London., W.C..  
Agents for the Applicants.

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